U.S. Department of Transportation

Intelligent Transportation Systems Standards Fact Sheet

August 2002

NTCIP 1405 Transit Communications Interface Profiles (TCIP) Spatial Representation Business Area Standard

Overview

The Transit Communications Interface Profiles (TCIP) is a family of standards that specifies the rules and terms for the automated exchange of information in transit applications such as operations, maintenance, planning, management, and customer services. TCIP standards define the information and information-transfer requirements among public transportation vehicles (PTVs), transit management centers (TrMCs), other transit facilities, and ITS centers. TCIP standards also identify mechanical and electrical interfaces (physical layer) and methods for ensuring data integrity (data-link layer), specify required message sets, and provide a common set of conformance requirements.

This standard, **NTCIP 1405, TCIP Spatial Representation Business Area Standard**, defines the spatial representation data elements (called "objects") for the TCIP. The ability to transfer information about the location of transit resources, such as vehicles, facilities, passenger stops, etc., is essential to the operation of any transit agency. The spatial reference methodology described in this standard represents the location of fixed and mobile objects.

The NTCIP family of standards is a joint project of the following standards development organizations:

American Association of State Highway and Transportation Officials (AASHTO)

Institute of Transportation Engineers (ITE)

National Electrical Manufacturers Association (NEMA)

(Contact information is shown at the end of this fact sheet)

To obtain a copy of this standard, please contact:
Global Engineering Documents
Web site: http://global.ihs.com

Publication Date: December 2000

What is this standard for?

The spatial representation business area provides other transit business areas with the vocabulary and format for representing common attributes for referencing spatial transit data elements, or "objects." For example, a route is generally identified by a route identifier and its physical representation. A route pattern may be represented by a sequence of timepoints, nodes and links, or by a series of intersections. Spatial features are composed of three primitive types: zero-, one- and two-dimensional objects, or point, line and polygon, respectively. In addition, transit data elements make significant use of complex spatial objects such as linked lines or traversals, which are referred to in this standard as "routes." These four classes of spatial elements (point, line, polygon, and route) cover most of this business area's location-referencing needs. These classes may be further specialized into various "layers:" topological, geographic, etc. Generally, for referencing data elements, TCIP business areas use geographic, topological and combined (geographic and topological) representations.

Each layer of the representation has various referencing methods. Translation from one layer to another is accomplished by indexing (or calibrating) key data elements between two or more layers. Definitions or guidelines of data structures that ensure interoperability among location referencing methods are not within the scope of this standard. However, data elements that can accomplish the translation are contained in the standard.

Who uses it?

This standard is intended for use by transit managers, software vendors and procurement personnel involved in the specification, selection, procurement, installation, operation, or maintenance of electronic transit applications.

How is it used?

The spatial representation business area supports all other TCIP business areas. It is used extensively within basic and compound messages, across advanced public transportation system (APTS) data flows and within National ITS Architecture

interfaces. A location class representation is associated with a TCIP object by grouping the transit object identifier with a point, line, polygon, or route-class representation.
This standard provides a list of objects (data elements) and messages necessary for conducting control center or transit management operations. It must be used in conjunction with the TCIP Framework Standard (NTCIP 1400). The TCIP Framework Standard organizes the information and data transfer requirements among public transportation vehicles, transit management centers, transit facilities, and other ITS centers. The Framework Standard also identifies physical and data link communication requirements, develops required message sets, and establishes a liaison between the Institute of Transportation Engineers (ITE) and other standards development organizations (SDOs).

Related documents

ISO/IEC 8824: 1994 – Abstract Syntax Notation One (ASN.1)

IEEE Std 1488-2000 – Trial Use Standard for Message Set Template for Intelligent Transportation Systems

IEEE Std 1489-1999 – Standard for Data Dictionaries for Intelligent Transportation Systems

NTCIP 1400 -- Transit Communications Interface Profiles (TCIP) Framework Standard

NTCIP 1401 -- Transit Communications Interface Profiles (TCIP) Common Public Transportation (CPT) Objects

Publication 28 – United States Postal Service: Postal Addressing Standards

SAE J2374 – Location Referencing Message Specification Information Report

FIPSPUB 173-1 -- Spatial Data Transfer Standard, United States Geological Survey (USGS)

FTA National Transit GIS: Data Standards, Guidelines, and Recommended Practices—Federal Transit Administration (FTA)

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